Nutrient Management Plan
for the
Manassas Campus
Northern Virginia Community College

Prepared for:

Northern Virginia Community College
Facilities Planning Division, Rm. 314B
8333 Little River Turnpike
Annandale, VA 22003

Prepared By:
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EEE Consulting, Inc.
8525 Bell Creek Road
Mechanicsville, VA 23116

Location Information	
Physical Address	*6901 Sudley Rd*
City State Zip	*Manassas, VA 20109*
Coordinates	*+38 48' 34.11"*
NAD 83 Deg Min Sec	*- 77 31' 3.51"*
VAHU6 Watershed Code	*PL44 – Middle Bull Run*
County	*Prince William*

Square Footage of Management Areas	
Total	*Total: 16.36 acres (712,890 ft^2)*
Area 1	*14.74 acres (642,184 ft^2)*
Area 2	*1.62 acres (70,706 ft^2)*

Plan Start Date	*July 15, 2018*
Plan End Date	*July 15, 2021*

Planner Signature	

TABLE OF CONTENTS

1.0 INTRODUCTION AND SITE DESCRIPTION 1

1.1 Introduction 1

1.2 Site Description 1

1.3 Current and Future Turf Maintenance 1

2.0 SOIL SAMPLING AND ANALYSIS 2

3.0 NUTRIENT MANAGEMENT AREAS 2

3.1 Nutrient and Liming Applications 2

3.1.1 Nitrogen, Phosphorous and Potassium 2

3.1.2 Lime and pH 4

3.2 Problem Turfgrass Areas and Temporarily Inactive Nutrient Management Areas 4

3.3 Selection of Fertilizers 5

3.4 Pre- and Post-Emergent Herbicides 5

3.5 Precautions for Fertilizer Applications 5

4.0 ENVIRONMENTALLY SENSITIVE AREAS AND RECOMMENDED BUFFERS 6

5.0 OTHER TURF MANAGEMENT CONSIDERATIONS 6

6.0 RECORDKEEPING 7

7.0 REFERENCES 7

TABLES

Table 1: **Soil Test Summaries**
Table 2a: **Nutrient Application Worksheet-Nutrient Management Area 1**
Table 2b: **Nutrient Application Worksheet-Nutrient Management Area 2**

FIGURES

Figure 1: **Manassass Campus–Project Location**
Figure 2: **Manassass Campus-Soil Sampling Areas**
Figure 3: **Manassass Campus-Nutrient Management Areas**
Figure 4: **Manassass Campus-Liming Requirements**

APPENDICES

Appendix A **Laboratory Soil Test Results**

1.0 INTRODUCTION AND SITE DESCRIPTION

1.1 Introduction

This Nutrient Management Plan (NMP) is for the Manassas Campus of the Northern Virginia Community College (NOVA) located in the western portion of Prince William County, Virginia, just north of I-66 (Figure 1).

This NMP addresses only the nutrient management of turfgrass. Management of other vegetated areas containing trees, flowering ornamentals, small shrubs and groundcovers, is performed by each facility and their landscape contractor based on very site specific conditions including but not limited to the type and status of vegetated areas, annual soil testing, and the occurrence of pests and weeds. This NMP is effective for three years (until July 15, 2021) or until major renovation or other changes to maintenance practices occur. This NMP should be used as a resource for planning the quantity and timing of turfgrass nutrient application based on sound agronomic practices.

1.2 Site Description

The 101-acre Manassas Campus contains turfgrass in many areas including around campus buildings, along roadways and around and within parking lots. The Manassas Campus has an athletic field used for lacrosse and other field sports as well as a large turf area surrounding an amphitheater. All turf areas, with exception to the athletic field, have been seeded with a tall fescue blend (mix of fine leave tall fescue and Kentucky bluegrass) and are therefore categorized as cool season turf. The athletic field, which was installed in 2014, is seeded with warm season bermudagrass.

The area surrounding the amphitheater is very sloped as well as the area behind Buildings MB and MT. In general, turf conditions are good except for some of the turfed medians and the strongly sloped areas surrounding Buildings MB and MT.

Only the athletic field is irrigated. The remainder of the turf is non-irrigated.

Six environmentally sensitive areas including streams and wetlands in the central and southern part of campus, and stormwater management facilities were identified on the Manassas Campus. These areas are addressed in Section 4.

1.3 Current and Future Turf Maintenance

A landscaping maintenance contractor will be performing most turf management including all nutrient applications. It will be the responsibility of the Landscape Supervisor and the campus Facility Manager to ensure the management plan is followed.

2.0 SOIL SAMPLING AND ANALYSIS

Although most of the soils in the turf areas have been modified by cut and fill activities, many areas still retain some of the characteristics from the U.S. Department of Agriculture (USDA) soil survey and may still be classified as loams to clay loams. The USDA soil survey indicates some of the soils on the campus were characterized as hydric or partially hydric soils with low infiltration rates and high runoff potential.

Soil samples were collected on February 12, 2018 from three (3) different turfgrass areas across the campus and submitted for laboratory analysis including pH, buffer pH, phosphorus and potassium, and other soil properties. Figure 2 shows the locations of the soil sampling areas as well as environmental sensitive areas and Table 1 presents the laboratory results. Appendix A presents the soil laboratory data. No sampling was performed within wooded or landscaped areas.

Soil laboratory results were converted into nutrient management ratings based on the Virginia Nutrient Management Standards and Criteria (VNMS&C). Soil phosphorous levels ranged from L- to L+, and potassium concentrations ranged from M- to H. Soil pH ranged from 5.7 to 6.9 Standard Units (SU), with all but one sample having a pH above the target level of 6.2 for turf.

3.0 NUTRIENT MANAGEMENT AREAS

Based on the soil test results, current turf conditions, the intensity of use, and overall visibility and aesthetic considerations, two Nutrient Management Areas (NMA) at the Manassas Campus have been established for this NMP. The number of nutrient management areas was kept to a minimum to facilitate effective management and still protect water quality and maintain healthy turf. Figures 3 and 4 show the two nutrient management areas and liming areas, respectively. Tables 2a and 2b present the application schedule for the nutrient management and liming areas, discussed in greater detail in Section 3.1 below.

NMA 1 totals approximately 14.74-acres and includes all the cool season fescue turf at the Manassas Campus. As discussed in Section 3.2, some areas within NMA 1 should be temporarily removed from active nutrient management until an effective groundcover/turfgrass can be established. NMA 2 is the 1.62-acre warm season bermudagrass athletic field.

3.1 Nutrient and Liming Applications

3.1.1 Nitrogen, Phosphorous and Potassium

Nitrogen, phosphorous (P2O5) and potassium (K2O) are the three macronutrients essential for healthy turf and, along with lime applications, are the central focus of the NMP. Phosphorous and potassium recommendations are based on the soil laboratory results. Nitrogen recommendations are based on the turfgrass needs, not soil test results, which vary based on the type of turfgrass (cool vs. warm season) and level of management (standard vs. intensive).

Recommended rates and timing of all three macronutrients is based on the VNMS&C. This NMP uses the most restrictive application rate for each NMA based on individual sample results where multiple sampling areas are part of the same NMA.

Based on the VNMS&C, the recommended annual nitrogen application amount is 5.0 pounds per 1,000 square feet for warm season turf as shown on Table 2a and 2.8 pounds per 1,000 square feet for cool season turf as shown on Table 2b. If facility personnel opt to overseed the warm season Bermudagrass athletic fields using perennial ryegrass in the fall, the VNMS&C allows for additional nitrogen applications totaling up to 1.0 pound per 1,000 square feet with specific application restrictions (see Tables 2a and 2b).

The acceptable window for nitrogen application for cool season fescue turf (NMA 1) at the Manassas Campus is from February 27 until December 6. Although aggressive spring and summer nitrogen fertilization can result in lush, dark green foliage, this occurs at the expense of the turf's root system. Turf with an inadequate root system will then struggle in the summer heat and moisture conditions. Additionally, too much nitrogen in spring and summer for cool season turf can result in leaching or runoff to nearby waterbodies. The bulk of nitrogen should be applied in monthly increments from September through November.

The acceptable window for nitrogen application for non-overseeded warm season turfgrass (NMA 2) at the Manassas Campus is from April 10 through September 25. April to May nitrogen applications should not be made until after complete green-up of turf. Fields overseeded with ryegrass in the fall are allowed additional late fall and early spring nitrogen applications after the perennial ryegrass is well established as identified in Table 2a. The bulk of nitrogen should be applied in monthly increments from June through August. February to March and October to November applications of nitrogen should only be performed if overseeding with perennial ryegrass.

Much like cool season fescue, heavy nitrogen fertilization in spring causes excessive shoot production and can weaken root development and set the turf up for disease. Heavy spring nitrogen fertilization can also be detrimental to the grass if there is a late frost after green-up. Avoiding excessive nitrogen applications in late summer and early fall can also reduce disease severity.

Phosphorous and potassium recommendations found on Tables 2a and 2b are based on the soil laboratory results, the VNMS&C, and overall turf conditions as observed during the soil sampling site visit. This NMP uses the most restrictive application rate of phosphorous and potassium based on individual sample results, where multiple sampling areas are part of the same NMA.

Phosphorous and potassium are less mobile than nitrogen and generally reside in soil for longer periods of time; therefore, the application timing of these two macronutrients is not as critical. Tables 2a and 2b present suggested nutrient application schedules based on the turf needs and requirements set by VNMS&C. As indicated on the tables, no more than 1.0 pound of total

nitrogen per 1000 square feet (using slow release forms) may be applied within a 30-day period (per VNMS&C). The nutrient applicator may use their discretion with the exact ratio of nutrients applied per application provided the maximum rate of nitrogen per application and total annual rates of all three nutrients are not exceeded as detailed in Tables 2a and 2b. The nutrient applicator may also create a different schedule to suit their needs, provided the conditions are met on Tables 2a and 2b.

3.1.2 Lime and pH

Soil acidity is critical to plants as it affects the availability of nutrients in the soil and potential leaching of nutrients from the soil. Most warm and cool season turfgrasses prefer a slightly acidic soil pH of approximately 6.2 Standard Units (SU). Periodic lime applications are necessary for many Virginia soils to correct low pH, add buffering capacity, and provide secondary nutrients calcium and magnesium as well as some micronutrients. Liming rates provided by the laboratory are based on the soil pH and the pH buffer indices. Based on the 2018 soil samples, a single lime application of 35 pounds per 1,000 square feet is recommended for soil sampling area MA-1. No lime is recommended for the remainder of the soil sampling areas. Table 2a shows the liming schedule and Figure 4 shows the turf areas which require lime.

Liming recommendations are only for the first year following sampling. The soil should be tested for soil pH and Buffer pH in the late fall to winter each following year to determine if liming is necessary following the initial recommended liming.

3.2 Problem Turfgrass Areas and Temporarily Inactive Nutrient Management Areas

Some of the medians in the parking lot north of the maintenance building have denuded areas due to a lack sufficient topsoil. The median ends and turfed area in the northern portion of the large parking lot close to the main entrance also has some denuded areas.

Areas where there is ineffective groundcover should be temporarily removed from active nutrient management until corrective measures can be applied to improve the turfgrass or groundcover condition. Corrective action options will vary by area but may include additional soil amendments (compost/topsoil), aeration or shallow tilling, and the use of mulch, turf mats and blankets. Alternative landscaping such as pavers, and other hardscape treatments may be the best alternative for some areas. If turfgrass is the desired vegetative cover, the soil should be retested for soil and buffer pH and adjusted accordingly with limestone as part of corrective action. Once turfgrass is re-established the areas may be included in Nutrient Management Area 1 for nutrient recommendations.

3.3 Selection of Fertilizers

Specific fertilizers have not been selected as a part of this NMP to provide greater flexibility and cost savings. The landscape contractor has the option to select either commonly used fertilizer blends that they may already have in stock or are readily available, or they can use custom blends, a common practice in the commercial landscaping industry. Slow release nitrogen containing fertilizers are recommended. This NMP will require revision should the landscape contractor and the campus Facility Manager decide to use animal manures or Class B biosolids (not of exceptional quality).

Provided the maximum rate of nitrogen per application and the total annual rates of all three nutrients are not exceeded as detailed in Table 2, the landscape contractor may use their discretion with the exact ratio of nutrients applied per application.

3.4 Pre- and Post-Emergent Herbicides

Weed control is a necessary requirement for healthy turf and has been implemented in the past at the Manassas Campus. In the previous NMP period, pre and post emergent herbicides containing nitrogen fertilizers were applied in spring and early summer months for the campus grounds. As presented in Section 3.1.1, only one application of slow release nitrogen is recommended in the late spring. Therefore, additional straight application of herbicides without nitrogen additives may be required.

Similarly, for the athletic field, it is best not to apply straight herbicides if using before spring green up and not to apply any herbicides containing nitrogen after September 1st. The Virginia Cooperative Extension (VCE) Publications 430-532 (cool season turf, http://pubs.ext.vt.edu/430/430-532/430-532_pdf.pdf) and 430-533 (warm season turf, http://pubs.ext.vt.edu/430/430-533/430-533_pdf.pdf) discuss pre and post emergent in more detail.

3.5 Precautions for Fertilizer Applications

General precautions for fertilizer application include:

- Avoid applying fertilizers on steep slopes 48-hours prior to a rain event.
- Do not apply fertilizers to frozen or snow covered ground, nor should they ever be used as ice melt.
- Avoid/minimize application of fertilizers to impervious areas such as parking lots, roads, and sidewalks, and within 25 feet of environmentally sensitive areas and stormwater collection/management facilities.
- Remove any granular materials that land on impervious surfaces by sweeping and collecting, and either put the collected material back in the bag, or spread it onto the turf.

4.0 ENVIRONMENTALLY SENSITIVE AREAS AND RECOMMENDED BUFFERS

Several environmentally sensitive areas including stormwater management facilities were identified on the Manassas Campus as shown on Figure 2 and 3:

- Two rain Gardens North and East of Building MH
- Retention Basin located Southeast of Building MC
- Stream and wetlands through central and southern part of campus

A no-fertilizer/pesticide application buffer area of at least 25 feet and preferably 50 feet should be established around these sensitive areas. Where practicable, native vegetation may be an alternative to turf in the buffer areas. Turf in the detention basin and swale should be mowed at a greater height.

It is noted that identification of sensitive natural resources areas such as wetlands and streams is based on the publically available National Hydrologic Dataset and the U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory Maps. Field mapping of other wetlands and streams that may exist on the campus was outside the scope of this NMP.

5.0 OTHER TURF MANAGEMENT CONSIDERATIONS

Aeration - Extensive core cultivation/aeration in the late summer to early fall is recommended for the Manassas campus. Core aeration is very disruptive to surface smoothness, but it is the best way to relieve the physical effects of soil compaction and increase soil oxygen levels.

Grass Seed Type – VCE 2014-2015 - Virginia Turfgrass Variety Recommendations https://www.sites.ext.vt.edu/newsletter-archive/turfgrass/index.html - (most recent year) should be referenced when selecting seed mix for over-seeding. The type should be suitable to environmental conditions of the Northern Virginia Transition zone. A general recommendation for the Manassas Campus is 90% Tall Fescue possibly blended with 10% Kentucky Bluegrass for turf in primarily sunny locations. Fine fescue blends may be more appropriate for shadier turf areas.

Iron - Iron applications (particularly foliar applications) may periodically be used for enhanced greening as an alternative to nitrogen. These applications are most beneficial if applied in late spring through summer for cool season grasses and in late summer/fall applications for warm-season grasses. Since iron is a micronutrient, its application levels are very low. The color response is short-lived (typically two to three weeks) because the iron-induced color response in the leaves is removed by mowing.

Returning and Management of Grass Clippings - The recycling of grass clippings on turf should be encouraged as an effective means of recycling nitrogen, phosphorus, and potassium. Where aesthetics allow, all clippings from mowing events should be returned to the turf rather than

discharging them onto sidewalks or streets. Clippings should not be blown onto impervious surfaces or surface waters, dumped down stormwater drains, or piled outside where rainwater will leach out the nutrients creating the potential for nutrient loss to the environment

Spreader Equipment Calibration - Spreader equipment calibration is critical to NMP implementation. The landscape contractor should supply equipment calibration records to the campus Facility Manager on a routine basis.

6.0 RECORDKEEPING

Proper NMP implementation requires diligent record keeping of fertilizer, lime and herbicide applications, and turfgrass conditions. Important information to retain with the plan includes soil tests reports; spreader settings; calibration results, dates of fertilizer application and rates applied; seeding or renovation; and unusual stresses caused by disease, drought, and pests. This information will also provide the background needed for future plan revisions.

7.0 REFERENCES

Nutrient Management Training and Certification Regulations 4VAC50-85 (effective date November 23, 2014)

Virginia Nutrient Management Standards and Criteria (Revised July 2014): http://www.dcr.virginia.gov/documents/StandardsandCriteria.pdf

Spring and Summer Lawn Management Considerations for Cool-Season Turfgrasses 430-532: http://pubs.ext.vt.edu/430/430-532/430-532_pdf.pdf

Winter Management and Recovery Tips to Optimize Athletic Field Safety and Performance for Spring Sports, VCE Publication 430-408: (http://pubs.ext.vt.edu/430/430-408/430-408_pdf.pdf)

Virginia Cooperative Extension Publication 2014-2015 - Virginia Turfgrass Variety Recommendations http://pubs.ext.vt.edu/CSES/CSES-17/CSES-17_pdf.pdf

TABLES

Table 1 - Soil Test Summaries

Site:	Manassas Campus - NOVA								
Testing Lab:	Waypoint Analytical (Formerly A&L Eastern Laboratories)								
Sample Date:	02/12/18								
Soil Sampling Area ID	Square Feet	Soil pH (SU)	Buffer pH (SU)	P (Mehlich I) ppm[1]	P (H/M/L)[2]	K (Mehlich I) ppm	K (H/M/L)[2]	Soil description	Turf Species
MA-1	304,675	5.7	6.78	0	L-	46	M-	Dark Brown, Sandy Loam	Cool season, fescue
MA-2	205,863	6.9	DNC*	2	L	81	M+	Dark Red-Brown, Sandy Clay Loam	Cool season, fescue
MA-3	131,646	6.5	DNC*	0	L-	88	H-	Dark Red-Brown, Sandy Clay Loam	Cool season, fescue
MA-4	70,706	6.6	DNC*	5	L+	119	H	Dark Brown, Sandy Loam	Warm season, bermuda

Notes: SU = Standard Units; ppm = parts per million; P and K ratings are from Virginia Nutrient Management Standards & Criteria.
DNC* = Buffer pH did not compute because the pH was above 6.2, according to Waypoint Analytical personnel.

Table 2a – Nutrient Application Worksheet-Nutrient Management Area 1

Site: **Manassas Campus – NOVA**
Begins: **7/15/2018** Expires: **7/15/2021**
Nutrient Management Area: **1**
Square Feet: **642,184 active**
Landscape Plants: **Cool Season Turf (Fescue)**

Annual Nutrient Needs (lbs/1000 ft^2)[1]	Application Month/Day[1,2]	Amendment Material Notes	% Slow Release N	Total N	Total P_20_5 (lbs/1000 ft^2)	Total K_20 (lbs/1000 ft^2)	Lime Recommendation (lbs/1000 ft^2)[3]
2.8*-2.5-1	April 15-June 15	N - fertilization & Lime	50% or greater	0.5	0	0	35 (MA-1)
	Sept 1	Aerate, Overseed & Fertilize	50% or greater	0.9	0.5	0.25	
	Oct 1	Fertilize	50% or greater	0.9	1.0	0.25	
	Nov 1	Fertilize & Lime	50% or greater	0.5	1.0	0.5	
	Totals:			**2.8**	**2.5**	**1**	

Notes:
*Up to 3.5 lbs of nitrogen per 1000 ft^2 is allowed for this NMA per the VNMS&C, but only 2.8 lbs per 1000 ft^2 is recommended in this plan.
1. Fertilizer recommendations are flexible provided the following conditions are met: a) no more than 0.7 pounds of Water Soluble N per 1000 ft^2 is applied within a 30-day period; b) no more than 0.9 pounds of Total N (per 1000 ft^2) may be applied within a 30-day period; and c) Total annual fertilizer amounts for each nutrient should not exceed the Annual Nutrient Needs listed in column 1.
2. The month and day designations are a general guideline. Apply as close to the month as possible, using the day designation to determine the interval between applications.
3. A single lime application is recommended for soil sampling area MA-1 in the amount of 35 lbs per 1000 ft^2. Lime applications are for the first year after sampling only. Liming for following years should be based on additional soil pH and Buffer pH testing.
4. Do not apply inorganic fertilizers on frozen or snow-covered ground, or on denuded areas. Any fertilizer that makes its way onto impervious surfaces should be swept or blown back into pervious turfgrass – covered areas. Do not use fertilizers as ice melt.
5. Use a drop spreader for application of inorganic fertilizers on turf areas less than 10 feet wide or on slopes greater than 2%.
6. Apply pre and or post emergent herbicides as needed, but do not use fertilizer containing herbicide prior to April 15th and conditions must be met in Note 1.

Table 2b - Nutrient Application Worksheet-Nutrient Management Area 2

Site: **Manassas Campus – NOVA**
Begins: **7/15/2018** Expires**: 7/15/2021**
Management Area**: 2 – Athletic Field**
Square Feet**: 70,706**
Landscape Plants: **Warm Season Turf (Bermuda)**

Table 2a – Nutrient Application Worksheet (NMA 2)

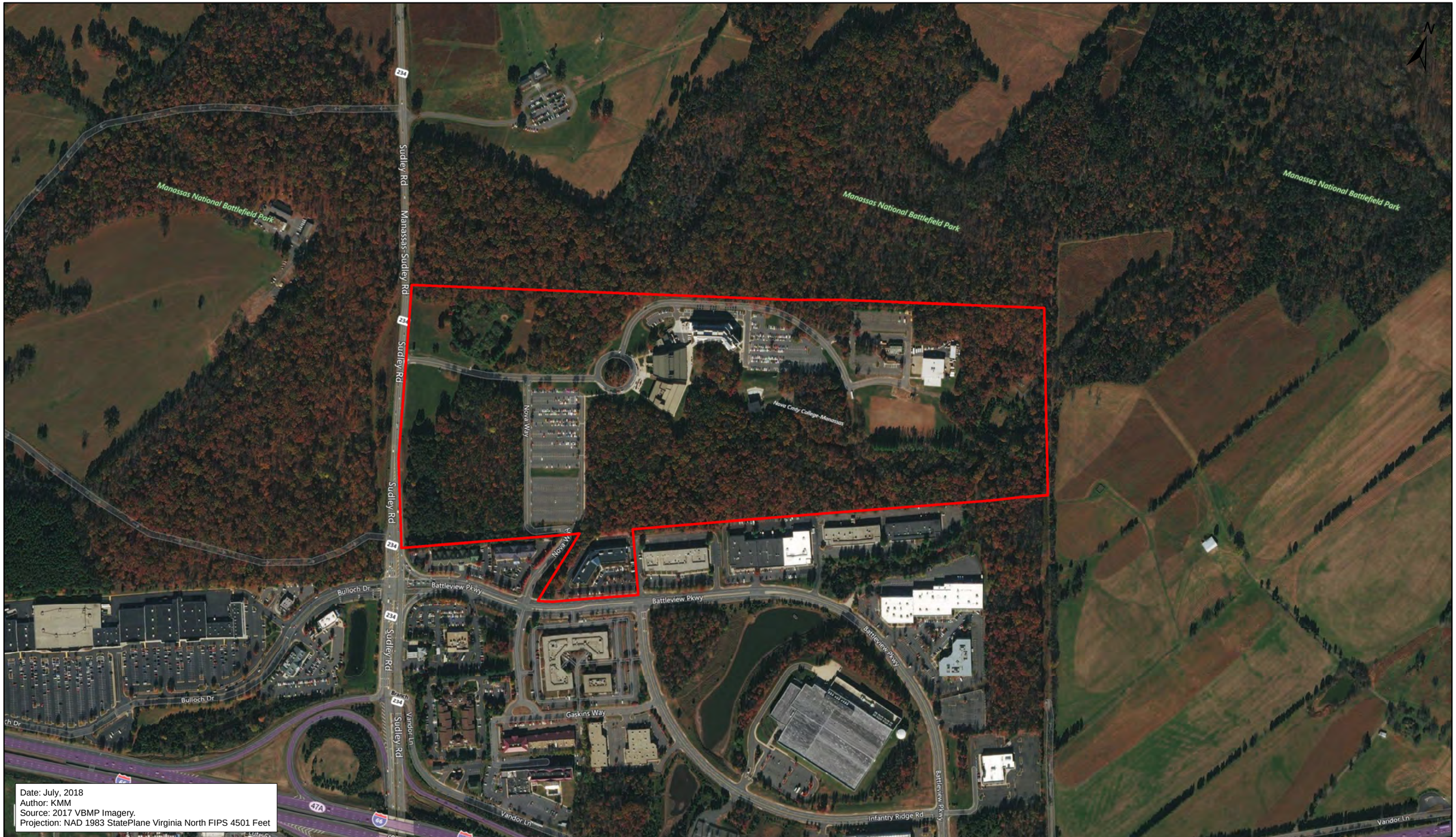
Annual Nutrient Needs (lbs/1000 ft^2)[1]	Application Month/Day[1,2]	Amendment Material Notes	% Slow Release N	Total N	Total $P_2 0_5$ (lbs/1000 ft^2)	Total $K_2 0$ (lbs/1000 ft^2)	Lime Recommendation (lbs/1000 ft^2)[3]
5.0-2.0-0.75	April	Lime					0
	April 10 - May 1	N - Fertilize	50% or greater	0.5(1b)	0	0	
	June 1	Fertilize	50% or greater	0.7(1d)	0	0	
	July 1	Fertilize	50% or greater	0.5(1d)	0.50	0.25	
	August 1	Fertilize	50% or greater	0.5(1d)	0.75	0.25	
	Sept 1 – Sept 15	N - Fertilize	50% or greater	0.5(1b)	0.75	0.25	
	Totals:			**5.0**	**2.0**	**0.75**	
If Overseeded with Perennial Ryegrass							
1.0-0-0(1e)	Oct – Nov	N - Fertilize	50% or greater	0.5(1e)	0	0	
	Feb - Mar	N - Fertilize	50% or greater	0.5(1e)	0	0	
	Totals:			**1.0**	**0**	**0**	

Notes:

1. Fertilizer recommendations are flexible if the following conditions are met: (a) no more than 0.7 pounds of Water Soluble N per 1000 ft^2 is applied within a 30-day period; (b) Water Soluble N must be applied as two applications not to exceed 0.35 lbs/1000 ft^2 each with a minimum of 15 days between applications. Alternatively, using a material containing slowly available nitrogen sources, split applications of 0.5 lbs/1000 ft^2 may be applied with a minimum of 15 days between applications; (c) no more than 1.0 pounds of Total N per 1000 ft^2 may be applied within a 30-day period; c) total annual fertilizer amounts for each nutrient shall not exceed the Annual Nutrient Needs listed in column 1; (d) if a material containing slowly available forms of nitrogen is used, nitrogen application rates up to 1.0 lb/1000 ft^2 may be applied in a single application with a minimum of 30 days between applications; (e) up to 1.0 lb/1000 ft^2 of additional nitrogen is allowed if overseeding with perennial ryegrass. This may be accomplished using split applications of 0.5 lbs/1000 ft^2 applied with a minimum of 15 days between applications.
2. The month and day designations are a general guideline. Apply as close to the month as possible, using the day designation to determine the interval between applications.
3. Lime areas are shown in Figure 4. No lime is required for the turf areas in NMA 2 for the first year of this NMP. Lime applications are only for the first year. Liming for years 2 and 3 shall be based on additional soil pH and Buffer pH testing.
4. Do not apply inorganic fertilizers on frozen or snow-covered ground, or on denuded areas. Any fertilizer that makes its way onto impervious surfaces should be swept or blown back into pervious turfgrass – covered areas. Do not use fertilizers as ice melt.
5. Use a drop spreader for application of inorganic fertilizers on turf areas less than 10 feet wide or on slopes greater than 2%.
6. Apply pre and/or post emergent herbicides as needed, but do not use fertilizer containing herbicide before April 15th. Conditions must be met in Note 1.

FIGURES

Figure 1: Manassas Campus–Project Location



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Manassas Campus
Figure 1: Project Location
NVCC NMP

0 250 500 Feet

Figure 2: Manassas Campus-Soil Sampling Areas

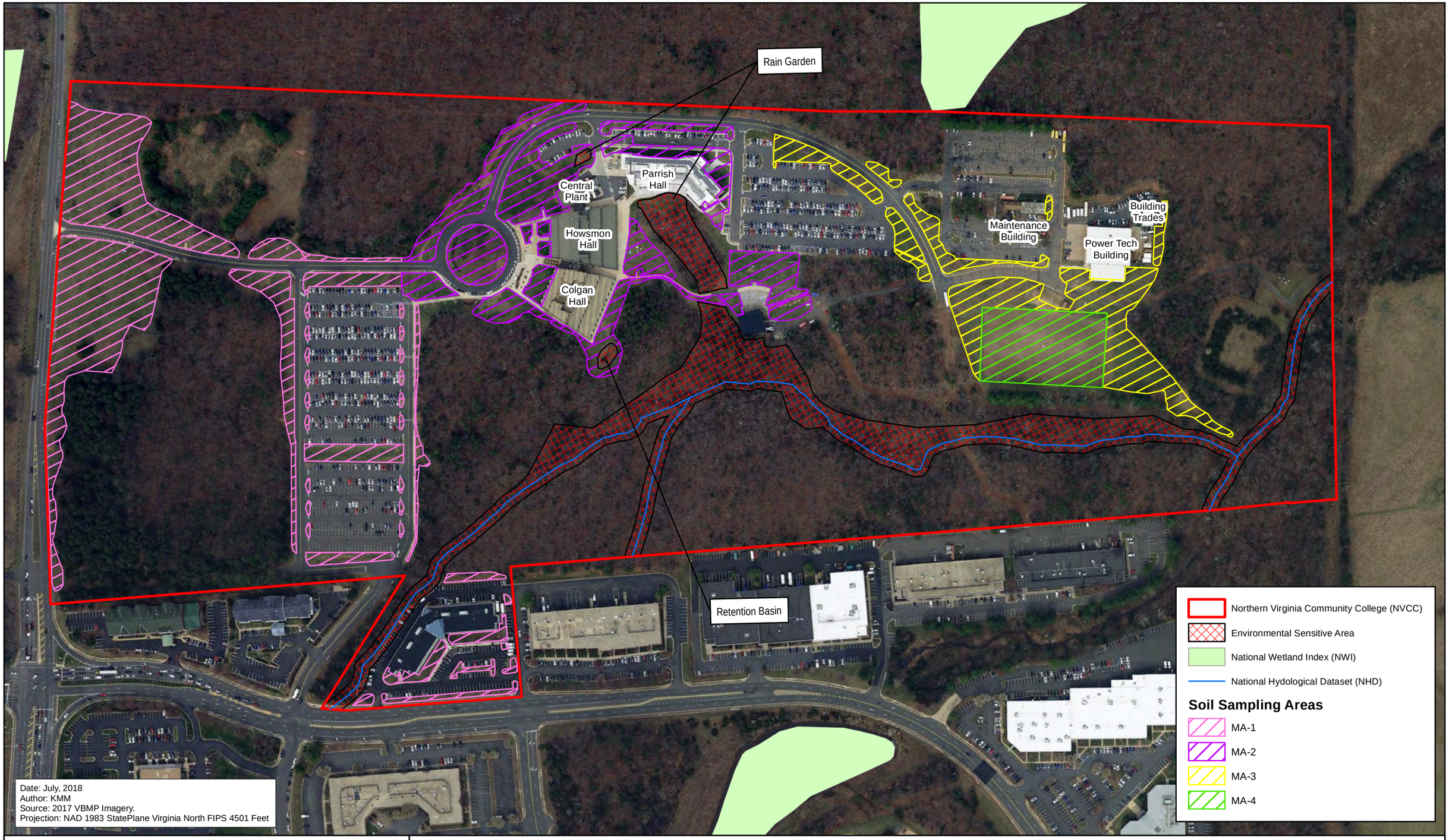

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Figure 2: Manassas Campus
Soil Sampling Areas
NVCC NMP

0 250 500 Feet

Figure 3: Manassas Campus-Nutrient Management Areas

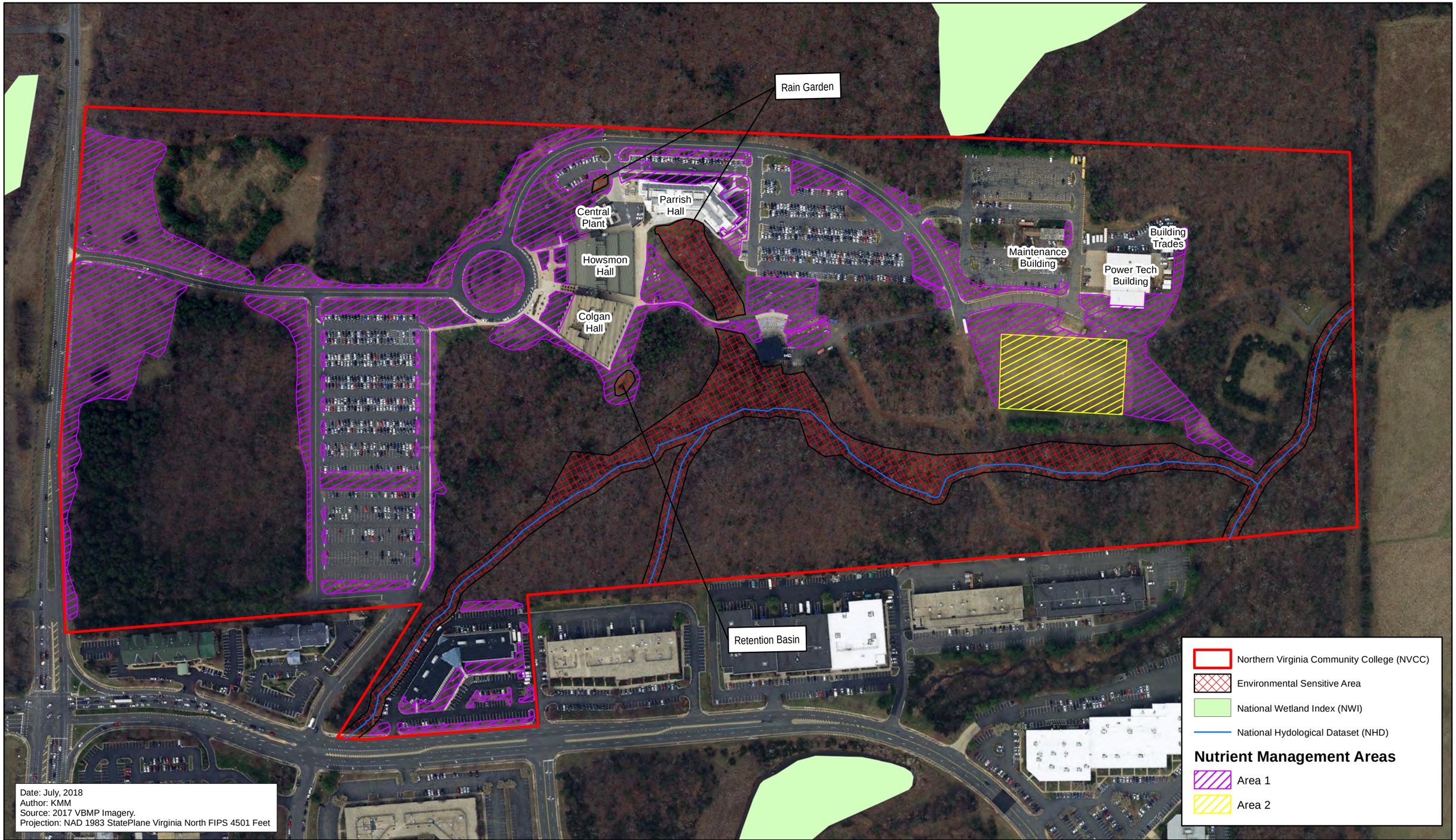

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Figure 3: Manassas Campus
Nutrient Management Areas
NVCC NMP

0 250 500 Feet

Figure 4: Manassas Campus-Liming Requirements

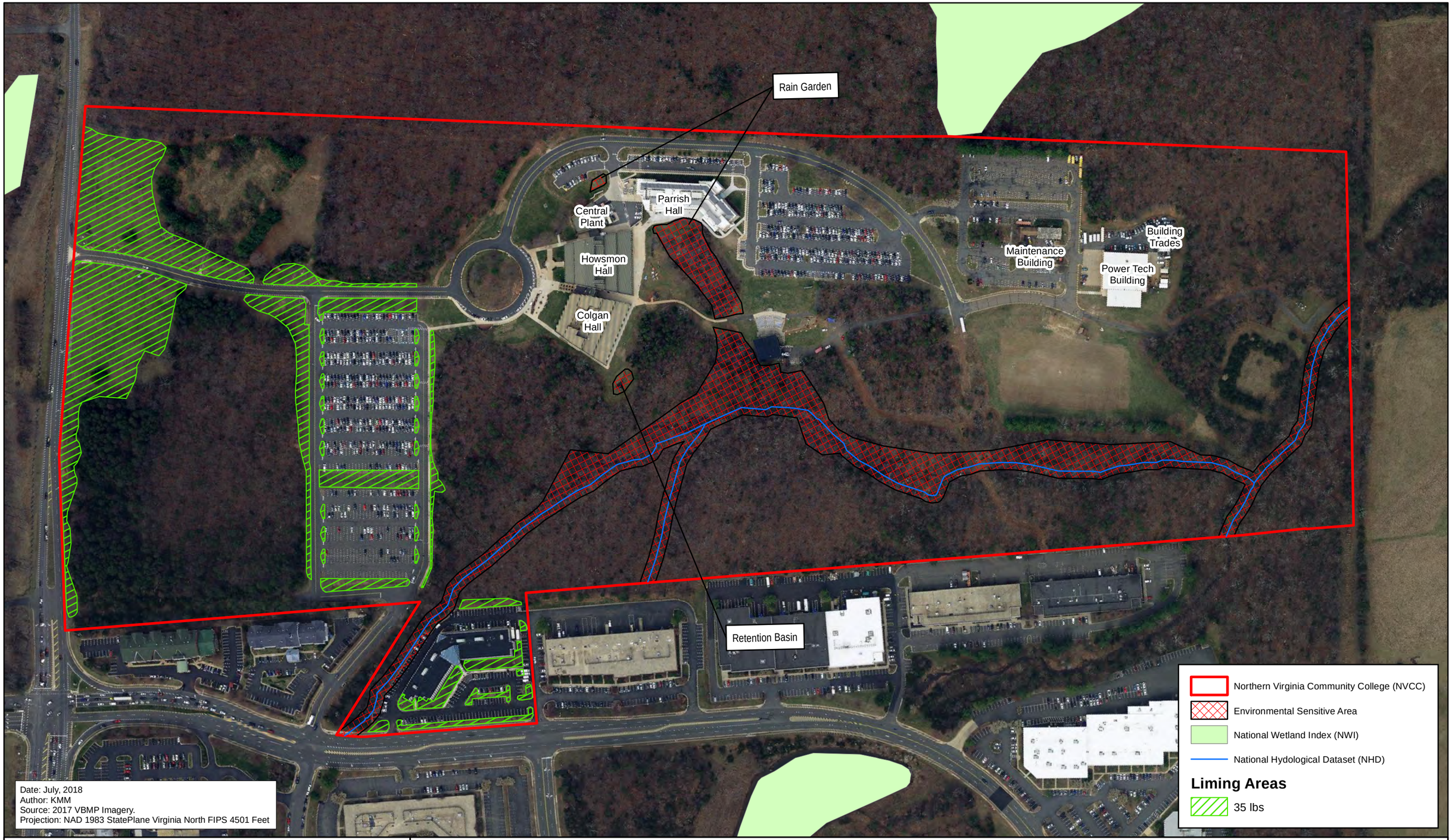

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Figure 4: Manassas Campus
Liming Areas
NVCC NMP

0 250 500 Feet

APPENDICES

Appendix A

Laboratory Soil Test Results

Report Number: 18-046-0754
Account Number: 78934

Waypoint ANALYTICAL
"Every acre...Every year."™

7621 Whitepine Road, Richmond, VA 23237
Main 804-743-9401 ° Fax 804-271-6446
www.waypointanalytical.com

Send To: EEE Consulting Inc
201 Church Street
Suite C
Blacksburg VA 24060

Grower: NVCC-Manassas
6901 Sudley Road

SOIL ANALYSIS REPORT

Analytical Method(s): SMP Buffer pH Mehlich 3 Loss On Ignition Water pH

Date Received: 02/15/2018 **Date Of Analysis:** 02/16/2018 **Date Of Report:** 02/16/2018

Sample ID / Field ID	Lab Number	OM	W/V	ENR	Phosphorus			Potassium	Magnesium	Calcium	Sodium	pH		Acidity	C.E.C
		% Rate	Soil Class	lbs/A	M3 ppm Rate	ppm Rate	ppm Rate	K ppm Rate	Mg ppm Rate	Ca ppm Rate	Na ppm Rate	Soil pH	Buffer Index	H meq/100g	meq/100g
MA-1	07539	4.1 M		122	7 VL			65 L	234 VH	735 M		5.7	6.78	1.5	7.3
MA-2	07540	3.5 M		108	12 VL			114 M	249 H	1228 H		6.9		0.1	8.6
MA-3	07542	4.6 M		125	7 VL			124 M	397 VH	1425 M		6.5		0.9	11.7
MA-4	07543	5.5 H		145	17 L			167 H	203 H	1527 H		6.6		0.6	10.4

Sample ID / Field ID	Percent Base Saturation					Nitrate	Sulfur	Zinc	Manganese	Iron	Copper	Boron	Soluble Salts		
	K %	Mg %	Ca %	Na %	H %	NO_3 N ppm Rate	S ppm Rate	Zn ppm Rate	Mn ppm Rate	Fe ppm Rate	Cu ppm Rate	B ppm Rate	SS ms/cm Rate		
MA-1	2.3	26.7	50.3		20.5										
MA-2	3.4	24.1	71.4		1.2										
MA-3	2.7	28.3	60.9		7.7										
MA-4	4.1	16.3	73.4		5.8										

Values on this report represent the plant available nutrients in the soil. Rating after each value: VL (Very Low), L (Low), M (Medium), H (High), VH (Very High). ENR - Estimated Nitrogen Release. C.E.C. - Cation Exchange Capacity.

Explanation of symbols: % (percent), ppm (parts per million), lbs/A (pounds per acre), ms/cm (milli-mhos per centimeter), meq/100g (milli-equivalent per 100 grams). Conversions: ppm x 2 = lbs/A, Soluble Salts ms/cm x 640 = ppm.

This report applies to sample(s) tested. Samples are retained a maximum of thirty days after testing.

Analysis prepared by: Waypoint Analytical Virginia, Inc.

by: Pauric McGroary

Pauric McGroary

Report Number: 18-046-0754
Account Number: 78934

Waypoint ANALYTICAL
"Every acre...Every year."™

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Date Received: 02/15/2018
Date Of Report: 02/16/2018

SOIL FERTILITY RECOMMENDATIONS

Sample ID Field ID	Intended Crop	Yield Goal	Lime Tons/A	Nitrogen N lb/A	Phosphate P_2O_5 lb/A	Potash K_2O lb/A	Magnesium Mg lb/A	Sulfur S lb/A	Zinc Zn lb/A	Manganese Mn lb/A	Iron Fe lb/A	Copper Cu lb/A	Boron B lb/A
MA-1	Lawn	0	0.0	3.5	4.0	1.0	0						
MA-2	Lawn	0	0.0	3.5	3.5	1.0	0						
MA-3	Lawn	0	0.0	3.5	4.0	1.0	0						
MA-4	Lawn	0	0.0	3.5	2.0	0	0						

Comments:

Sample(s) : MA-2,MA-3,MA-4 Crop: Lawn

For a more in depth explanation of the soil test and recommendations, go to our website www.aleastern.com and select the "Lawn and Garden" tab at the top of home page. Under the "How to Understand a Soil Test Report" header you will find the link to the article "Soil Test Report & Fertilizer Recommendation Explained".

The amount of fertilizer recommended on the first page is the total amount needed for the entire growing season. Split into 3-4 applications to keep the lawn green and prevent fertilizer loss. You should not apply more than 0.7 lbs of soluble nitrogen per 1000 square feet in a 30 day period. Or more than 0.9 lbs of nitrogen per 1000 square feet if you are using a slow or controlled release product in a 30 day period.Custom blend is best to meet exactly the requirement, if this is impossible, the above specific fertilizer application is a general guideline, if the specified grades can not be found, replace with fertilizer having similar N:P:K ratio. The best time to apply fertilizer for cool season grass (bluegrass, fescue, ryegrass) is in the Fall when the grass is growing. For Mid-Atlantic region the time is from late August to November. For Northeast region the time is from mid August to October. Fall application should start as soon as the day time high temperature is below 80-85F, apply with the interval of one month. If you start application late in the Fall and do not finish all three applications, repeat the same applications in the Fall of next year. Spring application is recommended when exceptional fertilizer loss due to heavy spring rain leaching and the grasses look pale green. Spring application can start as soon as the grass starts to grow in April. In the case of exceptional warm spring, the application can be made earlier.

"The recommendations are based on research data and experience, but NO GUARANTEE or WARRANTY expressed or implied, concerning crop performance is made."

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